APPLICATION OF THE DECISION THEORY FOR UNIVERSITY INDUSTRIAL LINK (UIL)

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Case Synopsis

The case was conducted to describe the application of decision theory in determining the best option in selecting source of research grant. The case started with the overview of University Industrial link (UIL) scenario and then looked into the strategic aspect of the collaborations that enable the school to make decision au fait with the needs of the university and social systems.

The State of Affairs

It was in the January 2012 management meeting when the Dean raised the importance that the School of Technology Management and Logistics (STML) shift into greater efforts and instill additional resources toward enhancing the university industrial link (UIL) portfolio.

"The top management of the University urges us to keep up with the University Industrial Link (UIL) key performance indicators (KPIs). But with limited resources, we need to focus on the most strategic way to proceed. As for now, I am not sure which will be the best way". All so sudden, the expectation of getting the "light bulbs" vanished into the thin air.

UUM-STML

STML, an academic school under the wing of UUM-COB, is made up of three departments namely: Technology Management, Operations Management and Logistics Management. Each department has a unique history with Logistics Management becomes the latest inclusion into the family. Technology Management was first enunciated when it was offered as a baccalaureate program in 1999. Then, in July

2004 and July 2006, academic programs under Logistics Management and Operations Management were established respectively. In July 2011, the three entities then congregated to form STML as it is known today.

In the next development phase, STML will strive hard to uphold the above framework. Three management fields will converge to form the building blocks of Green Management Philosophy. Business areas namely manufacturing, energy, nanotechnology, agro-business, ICT, construction business and transportation will be the STML's major concentration areas in all academic related activities throughout the entire system. These concentration areas will be supported by internal experts in the issues of SCM, Strategy & policy, Quality Management, Performance Management, Safety & Security Management and RDnI. In a broader perspective, Green Management strives toward continuous optimizations and sustainability.

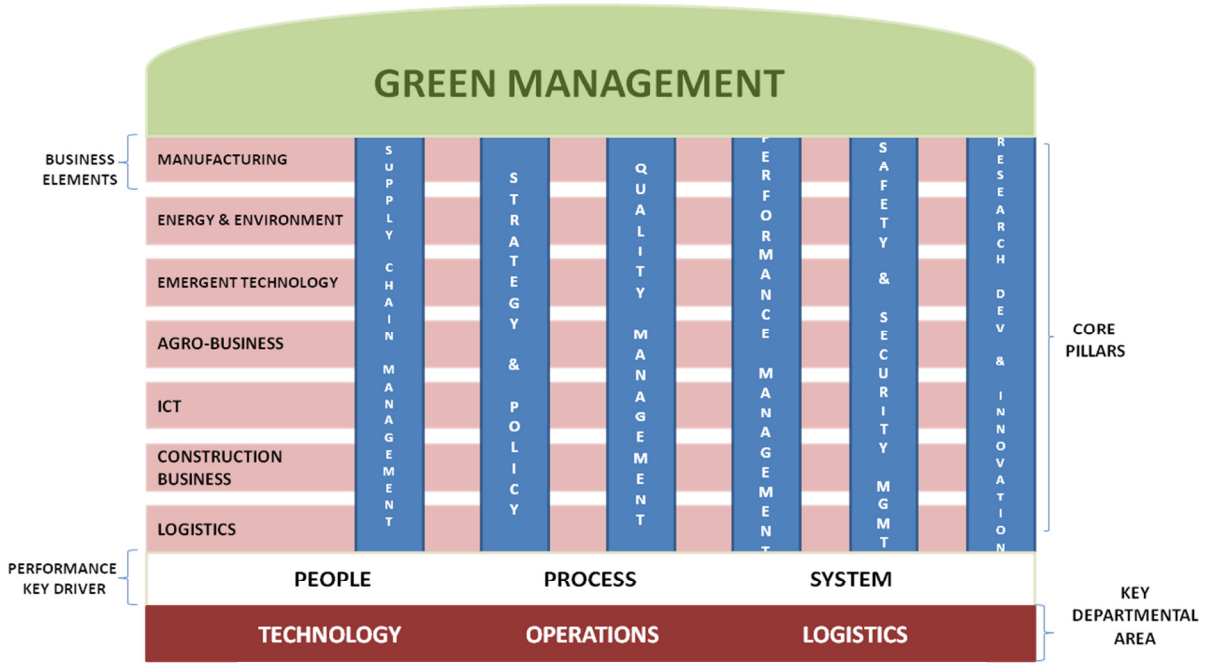

Figure 1: STML Strategic Direction 2010 - 2015

STML – THE BUSINESS MODEL

Going forward, STML will strive to succeed in its operations by facilitating the 4 key drivers (human capital, infrastructure, offerings and customers) as depicted by the above diagram. Each driver forms a unique significance in creating values required by customers and stakeholders. Customer values and experience are results from effective value propositions carefully designed in line with the ever changing needs of the environment. Effectively and efficiently blended resources, made up of human

capital and infrastructure, will continuously be the core elements that drive the system toward excellence. In the end, values perspective should translate the divergence between cost structure and benefits in the eyes of the organization and the stakeholders.

In driving the system toward excellence, STML progresses will be driven by a flexible structure designed to keep pace with the UUM-COB expansion programs. The school is led by the Dean and supported by two Head of Departments (HOD) that take charge of all academic programs offered under STML's wing. In order to smooth-run the administration and operation activities, an administrative officer, eleven committee chairpersons and one unit coordinator are attached to the management group to oversee all functional areas involved.

The STML Strategic Plan commits to support the new business model as illustrated below:

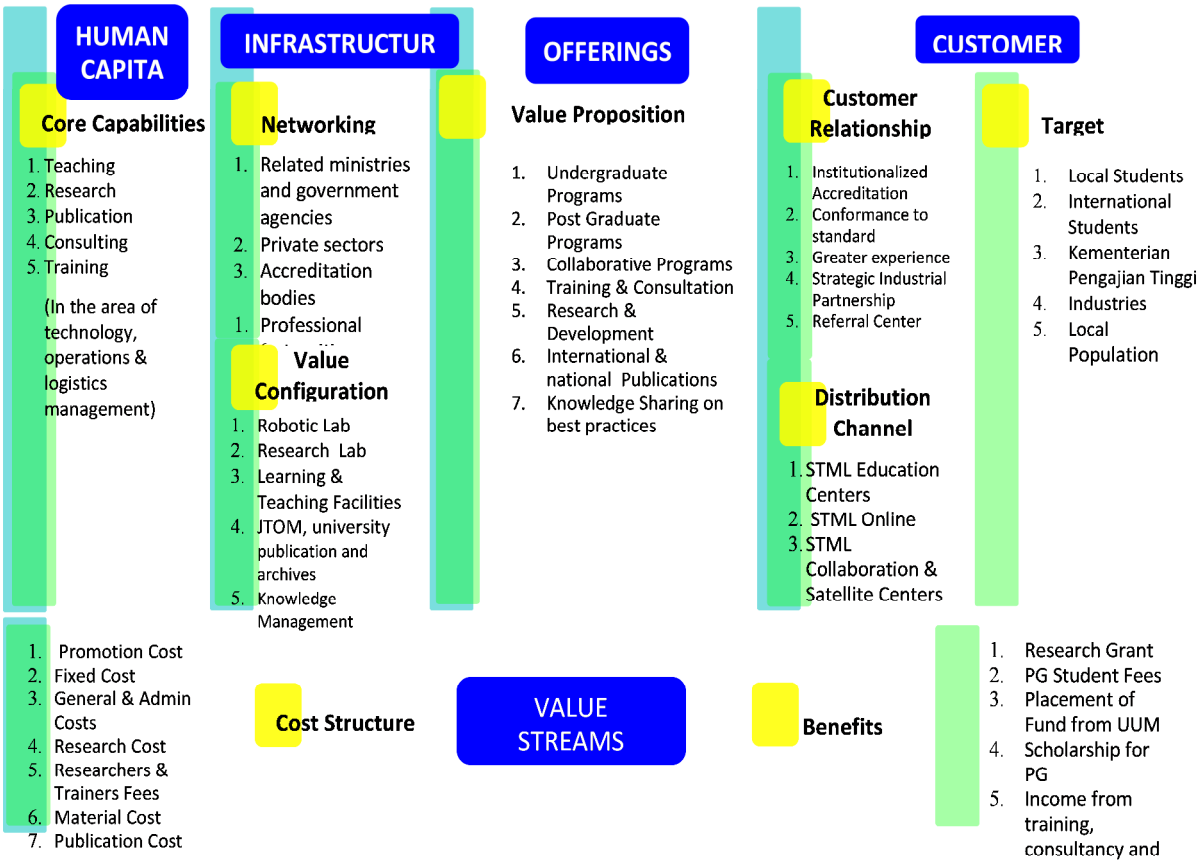

Figure 2: STML Business Model 2012

The Facts (Opportunities)

University – Industry collaboration has been accepted as important means for the academia to remain competitive and relevant for the industrial needs. The collaboration has been supported by the Malaysian government, particularly in enhancing the R&D. There is still a huge potential of research commercialization in this country given the fact that Malaysia has only been able to keep up with 3.5 per cent of those involved as compared to an average of 10 percent internationally.

Under the Eighth Malaysia Plan (8MP), the country spent by 0.49 percent of GDP on R&D. Meanwhile, under the 9th Malaysia Plan (9MP), allocation of R&D is targeted at 1.5 percent of GDP. Following the increase in this provision, the government has restructured its R & D funds In the 8MP, the provisions of the R&D funds provided under the Intensification of Research in Priority Areas (Intensification of Research in Priority Areas - IRPA). Meanwhile, in the 9MP, the fund is replaced with Science Fund and Techno Fund, each of RM1.2 billion and RM1.5 billion under the Ministry of Science, Technology and Innovation (MOSTI). The large amount of funds was attributed to the public competitively.

In addition to that, the Government through the Education Ministry has established the Fundamental Research Grant Scheme (Fundamental Research Grant Scheme - FRGS) under the ministry with an allocation of RM200 million. The restructuring of R&D funding is not only meant to intensify research in the country, but also to promote the commercialization of research results through tripartite cooperation, between the research institutes and universities, industries and public.

Goals

Major decision points in UIL initiative rests on the ultimate goals of the entities involved. Historically, referring to successful collaborations, most of the universities involved streamlined their partnership goals along the following avenues:

I. Partnerships that impact teaching and learning
   Building industrial cases through first-hand experience and then bringing them back for classroom activities.
II. Partnerships that develop new funding streams for universities
   University-industry large-scale partnerships that provide significant new funding streams to the university.
III. Partnerships that reinvent the role of the research university in the knowledge triangle

Universities and companies involved forge to establish novel, large-scale strategic partnerships aimed at helping transform the university culture and mission, intensifying its role in servicing the economy through partnerships that drive innovation.

IV. Partnerships that go strategic
Usually begin small and decidedly non-strategic. Progressively going strategic through proper leadership, interactions and participations. Therein, lies the skill of the managers.

(Source: Edmondson, 2012)

Means

"Let us start with Silterra Malaysia Sdn Bhd." The Dean proceeded with his address.

The collaboration seemed to be uncomplicated since STML had already had the experience of joint project with Silterra before. Silterra, on the other hand, had always welcome any initiatives for joint collaboration with the higher education institutions as this would enable the company to gain the competitive advantage and succeed in the era of knowledge economy.

"However, the way we collaborate must be strategic enough that both parties could enjoy huge benefits out of it!"

Then the Dean proceeded with emphasizing primarily on research, development and innovation (RD&I). He expected that the collaboration will results in a more iterative process of research partnership where the university invests in certain enabling capabilities that allow better fits with the industrial partners' needs. These development compounds will be then verified for suitability relative to their intended purpose and the information feedback to industry.

"How can STML or Silterra best achieve competitive impact from this university industry link?" A critical question left to be answered.

Most importantly, for sustained success in innovation, deep, long term, strategic partnerships are critical to both industry and academia.

Silterra Malaysia Sdn Bhd. 2012

Silterra Headquarter is located at Kulim Hi-Tech Park (KHTP), Kedah. KHTP is a high technology science park in the northern part of Peninsular Malaysia and only 36km away from Penang island. This park has the world-class high quality infrastructure in term of reliable power supply, high capacity fibre optic network and abundant water supply.

Silterra Malaysia is a leading semiconductor foundry that provides advanced foundry standard CMOS logic, high voltage and mixed-signal/RF technologies. Silterra is committed to world class service and environmental friendliness, received Notable Mention in the Malaysian Prime Minister's Hibiscus Award competition for Environmental Performance in 2003. The company is ISO 9001:2000 and ISO 14001 certified. Other than Kulim, Silterra has offices in Kuala Lumpur, San Jose (USA) and Hsinchu (Taiwan). The company manufactures semiconductor wafers. It offers complementary metal oxide semiconductor logic, high voltage, and mixed-signal/radio frequency process technologies. The company provides contract manufacturing for fabless and IDM customers' designs. It also offers project designs and IP verification service for customers and IP providers, as well as a design library for its process offerings to help the customers in product development. The company's products are used in computation, consumer, and communication electronics applications. It serves various customers, including semiconductor companies.

Silterra managed to achieve position as one of the top 20 foundries in the world in terms of revenue. A 2010 Gartner report on the top foundries in the world by revenue had located Silterra at the 17th spot with US$180 million (RM543.6 million). A key driver of this revenue comes from display drivers where Silterra has captured an estimated 21% of the global market for display drivers. Display drivers are chips that run the screens of smart phones and tablets and are appearing in an increasing number of other consumer digital devices. Gartner predicts that smartphone sales will triple to 492 million units by 2012 from 139 million in 2008. The computer market will expand to 443 million units from 290 million over the same period.

This remarkable progress may be attributed from the collaborative initiatives with the local universities. As indicated by Silterra Chief Executive Officer, Bruce Gray in one of the ceremony in 2006, "the collaboration is an important milestone for both Silterra and the universities". Silterra has collaborated with many higher learning institutions in different forms, namely through internship programs, staff industrial training, lifelong academic program for Silterra staff and research. It is hoped that these collaborations will help the company to succeed in the knowledge economy, businesses and forge lasting partnerships with academia. For example, joint collaboration work has been

executed between Silterra and the Environment Technology Programme, School of Industrial Technology, USM in 2008. Another project, Multi-Project Silicon Wafer Verification Programme was a joint effort between Silterra and the consortium to carry out the programme without financial ties.

University Industrial Link (UIL) – The Framework

It is unquestionable that when universities and industries are able to work in tandem in pushing the frontiers of knowledge, they could become a very powerful engine for innovation and economic growth. Silicon Valley is an exciting phenomenon manifesting university industry (UI) collaborations at its best. For over five decades, massive and long-running collaborations have given rise to new technologies, transformed industries, and not to mention, modernized the role of the university at a fast pace.

Usually, the channels of university-industry link can broadly be defined along the following four categories:

1. research support
2. technology transfer
3. knowledge transfer
4. cooperative research

This form of collaborative research involves a deepening of relations and offers greater scope for mutual benefits. Effective and strategic research collaborations are distinguished by greater depth of relationships between the partners and a longer-term focus regarding the interaction, as portrayed in Figure 4.

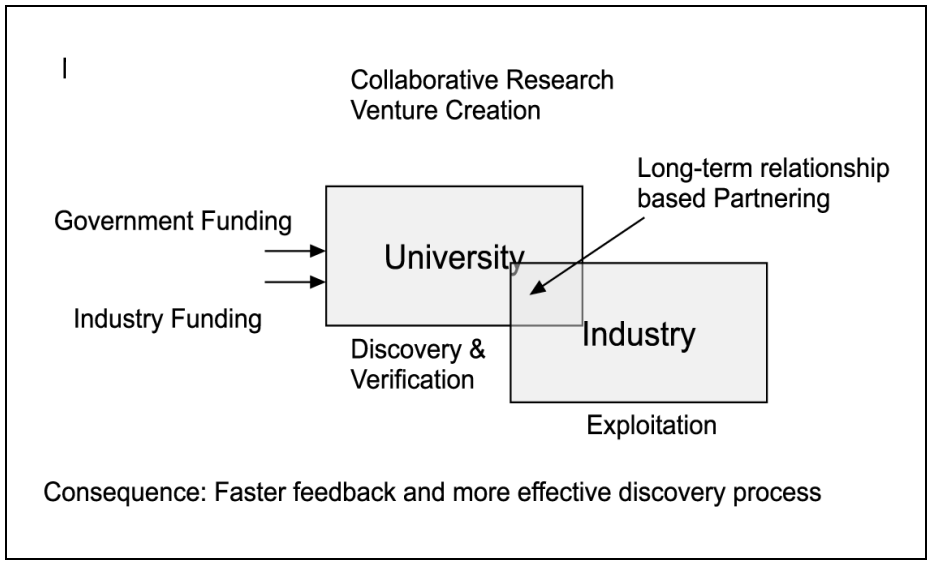

Figure 4: Collaborative Research Venture Creation (Dooley and Kirk, 2007)

STML- SILTERRA COLLABORATION DESIGN

Putting the Framework into Practice

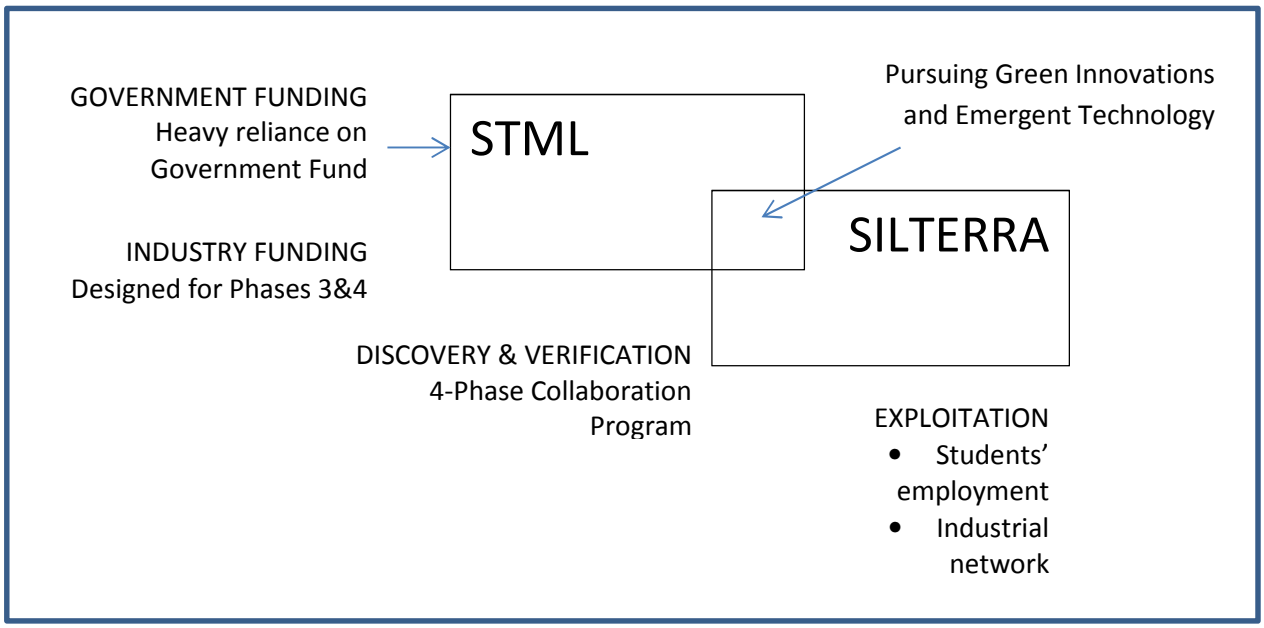

Figure 3: Proposed STML – SILTERRA Collaborations Framework

Prior to approaching the industrial partner (Silterra), the STML management team had pre identified and made clear critical elements, activities and responsibilities that need to be fulfilled along the framework identified. Those can be viewed as follows:

1. Long term relationship based partnering
   Reflecting upon the STML Business Model, collaborations appeared in three critical drivers as of Offerings, Customers and Value Streams which outlined the significance of UIL to the school in forward progress. Furthermore, Green Innovation and Emergent Technology had become the center of STML's attention, which was not difficult for the management to decide pursuing them with immediate effect.

2. Discovery & verification
   STML had decided to pursue partnerships with Silterra in view of the following phases:

   a. Phase 1:
      - Building the classroom materials through case study
      - Creating internship opportunities

   b. Phase 2: Engaging in industrial forums and discourses

c. Phase 3: Mutual capacity building
d. Phase 4: Innovations

3. Exploitation
    - Banking upon Silterra's products, technologies and accomplishments, STML would explore avenues for greater acceptance in view of graduate employment.
    - Building industrial network through forums and discourses

4. Government funding
   Government funding through Ministerial grants (MOE, MOSTI, etc.) would be of more convenience in patronizing the first three phases of collaborations.

   Basically there are two main sources of research fund as of those offered by the Ministry of Higher Education (MOHE) and from UUM itself. From MOHE, two main types of research are Fundamental Research Grant Scheme (FRGS) and Exploratory Research Grant Scheme (ERGS). Meanwhile, from UUM, the types of research mainly are through LEAD and case study research. All the feasible information is shown in Appendix 1 to 9.

   Table 1 below summarized the source of research grant, the type of each research, the research status, the quantity of research been awarded and lastly, the minimum and maximum value of the research.

TABLE 1: Summary of Research Grant Obtained by UUM Academic Staff (2010 – 2015)

SOURCE	TYPE	STATUS	QUANTITY	VALUE(RM)	
				MINIMUM	MAXIMUM
EXTERNAL	EXTERNAL	COMPLETED	27	5,000	283,198
	EXTERNAL	ON GOING	29	8,000	800,000
MOHE	FRGS	COMPLETED	21	17,000	60,000
	FRGS	ON GOING	102	12,900	83,360
	ERGS	ON GOING	23	39,000	97,000
UUM	LEADS	COMPLETED	40	5,400	12,000
	LEADS	ON GOING	123	5,000	12,000
	CASE STUDY	COMPLETED	6	10,000	10,000
	CASE STUDY	ON GOING	19	10,000	10,000

5. Industry funding
   Industrial funds would be more appropriate during phases three and four of the collaborations.

The Verdict

Primarily, the decision to enter into a research collaboration program with Silterra was well congruence with the strategic intention of the University based on relevant KPIs set for STML.

Then, since STML needed to decide on the best decision in getting the source of research grant, a simple assessment with decision theory could be applicable. A payoff table was constructed (as per Table 1) in assisting the decision making process. The following four important sets of information were summed up for funding decision purposes:

1. The 4-Phase Collaboration Program
2. The 4 research collaboration categories
3. The main sources of research grant
4. The state of nature will be the level of research coverage, either low or high. The research coverage is reflected form the minimum and maximum value of the research. For instance, the minimum value of external grant RM 5,000 will be considered as low research coverage, meanwhile the maximum value RM 800,000 will be considered as high research coverage.

For that, it is expected that the decision will enhance the value of the uncertainty and minimize the negative feedback loop formed in the collaboration project in the knowledge transfer process.

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